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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,289	10/30/2003	John D. Larson III	10030669-1	5397

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AGILENT TECHNOLOGIES, INC.
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EXAMINER

SUMMONS, BARBARA

ART UNIT PAPER NUMBER

2817

DATE MAILED: 03/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/699,289	Applicant(s) LARSON, JOHN D.	
	Examiner Barbara Summons	Art Unit 2817	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 February 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 28-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22, 25 and 26 is/are rejected.
- 7) ☒ Claim(s) 23 and 27 is/are objected to.
- 8) ☒ Claim(s) 1-30 are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicants' election with traverse of the invention of Group I (claims 1-25) in the reply filed on 2/22/05 is acknowledged. It should be noted that the grounds for the election with traverse are only between the inventions of Groups I and II.

Upon further review, the Examiner agrees that the restriction between Groups I and II is not proper because it appears that the filter of claim 1 would anticipate the process of filtering of claim 26. Therefore, the Examiner will examine the claims of the inventions of both Group I and Group II (i.e. claims 1-27) in this Office action.

2. Because applicants did not distinctly and specifically point out the supposed errors in the restriction requirement between the invention of Group III and the inventions of Groups I and II, the election has been treated as an election without traverse (MPEP § 818.03(a)).

3. Claims 28-30 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention Group III, there being no allowable generic or linking claim. Election was made **without** traverse (see paragraph 2 above) in the reply filed on 2/22/05. To maintain clarity in the image file wrapper system, Applicants are urged to cancel claims 28-30 in response to this Office action.

Specification

4. The disclosure is objected to because of the following informalities: On page 1, at section [0001], line 2, "10/XXX,XXX" should be changed to - - 10/699,481 - -. On

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page 5, line 11, "7K-7S" should correctly be - - 7K-7T - - since the figures include a Fig. 7T (see page 5, line 12 and sheet 9/10 of the drawings).

Appropriate correction is required.

Double Patenting

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 1, 3-10, 14 and 15-17 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 2-9, 9 and 10-12, respectively of copending Application No. 10/699,481.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the "band-pass filter" of the instant application and the "transformer" of the '481 application have the same claimed structure and all that is different is the name given the structure based on the intended use thereof (i.e. filter or transformer).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 3, 10, 14-16, 18 and 26 are rejected under 35 U.S.C. § 102(b) as being anticipated by Poirier et al. U.S. 3,568,108.

The figure of Poirier et al. discloses a band-pass filter (i.e. the filter will pass some band of frequencies see col. 4, lines 5-12), and a method of filtering, comprising: a stacked pair of film bulk acoustic resonators (FBARs), the upper/input FBAR having piezoelectric material 49 between electrodes 48 and 51, and the lower/output FBAR having piezoelectric material 56 between electrodes 55 and 57; an acoustic decoupler that couples less acoustic energy between the FBARs than would be coupled by direct contact between the FBARs (see e.g. the last sentence of the abstract); and wherein the acoustic decoupler is comprised of layers 51, 53 and 54 of acoustic decoupling material forming a Bragg structure of alternating high and low impedance layers 51, 53 and 54 (see e.g. col. 3, lines 53-57) that can have a “nominal” thickness equal to an odd multiple of one quarter of a wavelength (see col. 3, lines 51-56 and col. 4, lines 52-57)

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since the range "between one-half wavelength... and an odd number of quarter wavelengths" includes values "nominal" or infinitely close to odd quarter wavelengths.

9. Claims 1-6, 10, 14-16, 18, 24 and 26 are rejected under 35 U.S.C. § 102(e) as being anticipated by Lakin U.S. 6,720,844.

Fig. 3 of Lakin discloses a band-pass filter, comprising: a stacked pair of FBARs including a top FBAR 300 with a piezoelectric layer 302 and electrodes 303 and 304 electrically connected to first terminals 301 and 305, and a bottom FBAR 313 with a piezoelectric layer 306 and electrodes 307 and 314 electrically connected to second terminals 315 and 316; and an acoustic decoupler comprising layers 350-352 located between the FBARs and controlling the amount of acoustic coupling between the FBARs so as to couple less acoustic energy between the FBARs than would be coupled by direct contact between the FBARs (see e.g. the abstract and col. 6, lines 31-40).

Regarding claim 2, curve 82 in Fig. 8 and see col. 6, lines 36-38 and 42-44. Regarding claims 3-6 and 24, the acoustic decoupler comprises a layer (e.g. 350) of acoustic decoupling material that is SiO₂ (see analogous layer 450 in Figs. 12 and 4) and so has an acoustic impedance less than the acoustic impedance of the piezoelectric material (also shown in Fig. 12 impedance column), and intermediate between the acoustic impedance of the piezoelectric material and air, and in the recited range of 2 to 16 Mrayl.

Regarding claims 10, 14-16, 18 and 24, the acoustic decoupler comprises a three layer Bragg structure of alternating low impedance layers (350 and 352) and high impedance layer 351 and may comprise more or less layers (see col. 6, lines 31-40),

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wherein the layers have a nominal thickness of one quarter wavelength at the center frequency (see col. 6, lines 11-15) which is an odd multiple of one quarter wavelength.

10. Claims 1, 3-6 and 19-22 are rejected under 35 U.S.C. § 102(e) as being anticipated by Ella et al. U.S. 6,670,866 (of record).

Regarding claims 1, 3 and 19-22, Fig. 7 of Ella et al. discloses a balanced to unbalanced (balun) transformer that must also inherently act as a band-pass filter for passing at least the same pass band as the ladder filter 120 (Fig. 8) to which it is connected, comprising: a stacked pair of FBARs the lower FBAR having opposed electrodes 40 and 44 sandwiching piezoelectric layer 42, and the upper FBAR having opposed electrodes 60 and 64 sandwiching piezoelectric layer 62; and an acoustic decoupler 50 between the FBARs, the acoustic decoupler being a layer 50 of acoustic decoupling material (see col. 10, lines 24-27); an electrical connection between adjacent electrodes 60 and 44 connecting to ground 12, the acoustic decoupler being located between the adjacent electrodes 60 and 44; and a ladder filter electrically connected in series with the stacked FBARs of Fig. 7 as shown in Fig. 8, wherein the ladder filter comprises additional FBARs as shown in Figs. 14 and 15.

Regarding claims 4-6, Ella discloses the acoustic decoupler 50 as silicon oxide (see col. 10, lines 33-38), which inherently has an acoustic impedance less than the acoustic impedance of the piezoelectric materials listed (see col. 1, line 67 to col. 2, line 3), the acoustic impedance being merely a property of the material that can be found in a suitable textbook (see also other art of record).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 7-9, 11-13, 17 and 25 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Lakin U.S. 6,720,844 in view of Ella U.S. 6,278,342.

Lakin discloses the invention as discussed above, except for the layer of acoustic decoupling material comprising plastic, polyimide, or poly(para-xylylene)[a.k.a. parylene], and two of the high impedance Bragg layers being the electrodes of the FBARs.

Ella discloses that it is known to use polymers as the low acoustic impedance materials in an acoustic decoupling Bragg structure (see e.g. col. 3, lines 18-33 and col. 9, lines 22-27 and 33-40), and also discloses the electrode of the FBAR being one of the high acoustic impedance layers of a Bragg structure (see col. 3, lines 46-48).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the filter of Lakin (Fig. 3) by having used electrodes (303 and 314) of the resonators as high acoustic impedance layers, and by having replaced one or more of the low acoustic impedance decoupling layers (350,352) with a plastic or polymer such as polyimide or parylene in view of the explicit suggestion to use these materials in such Bragg structures by Ella (col. 3, lines 18-33 and col. 9, lines 22-27 and 33-40) and the explicit suggestion by Ella to use electrodes of the resonators as high impedance layers (col. 3, lines 46-48).

Allowable Subject Matter

13. Claims 23 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The article "Polymer Films as Acoustic Matching Layers" to Hadimioglu et al. teaches using polyimide or parylene as art recognized alternative acoustic impedance matching layers.

Ylilammi et al. U.S. 5,873,154 discloses an FBAR with a single polymer matching layer 36 (Fig. 2).

Kolm U.S. 3,321,648; Fowler U.S. 3,189,851; and Fowler et al. U.S., 3,174,122 each show FBARs with an acoustic decoupler (e.g. cushion material) therebetween.

Poirier et al. U.S. 3,422,371 (Fig. 5) discloses two stacked FBARs acoustically coupled to a certain degree by a Bragg structure.

Weber U.S. 5,864,261 discloses stacked FBARs acoustically decoupled by a Bragg structure (Fig. 5) and coupled through elements 150 and 151.

Ella U.S. 5,910,756 discloses stacked FBARs connected to ladder filters to form larger filters.

Dworsky et al. U.S. 5,294,898 discloses stacked FBARs used in a filter.

Clawson et al. U.S. 3,610,969 discloses that it is known in the art that transformer structures also provide filtering (see e.g. the Title).

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara Summons whose telephone number is (571) 272-1771. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 271-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

bs
March 10, 2005



**BARBARA SUMMONS
PRIMARY EXAMINER**